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March 28, 1953

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SCIENCE NEWS LETTER

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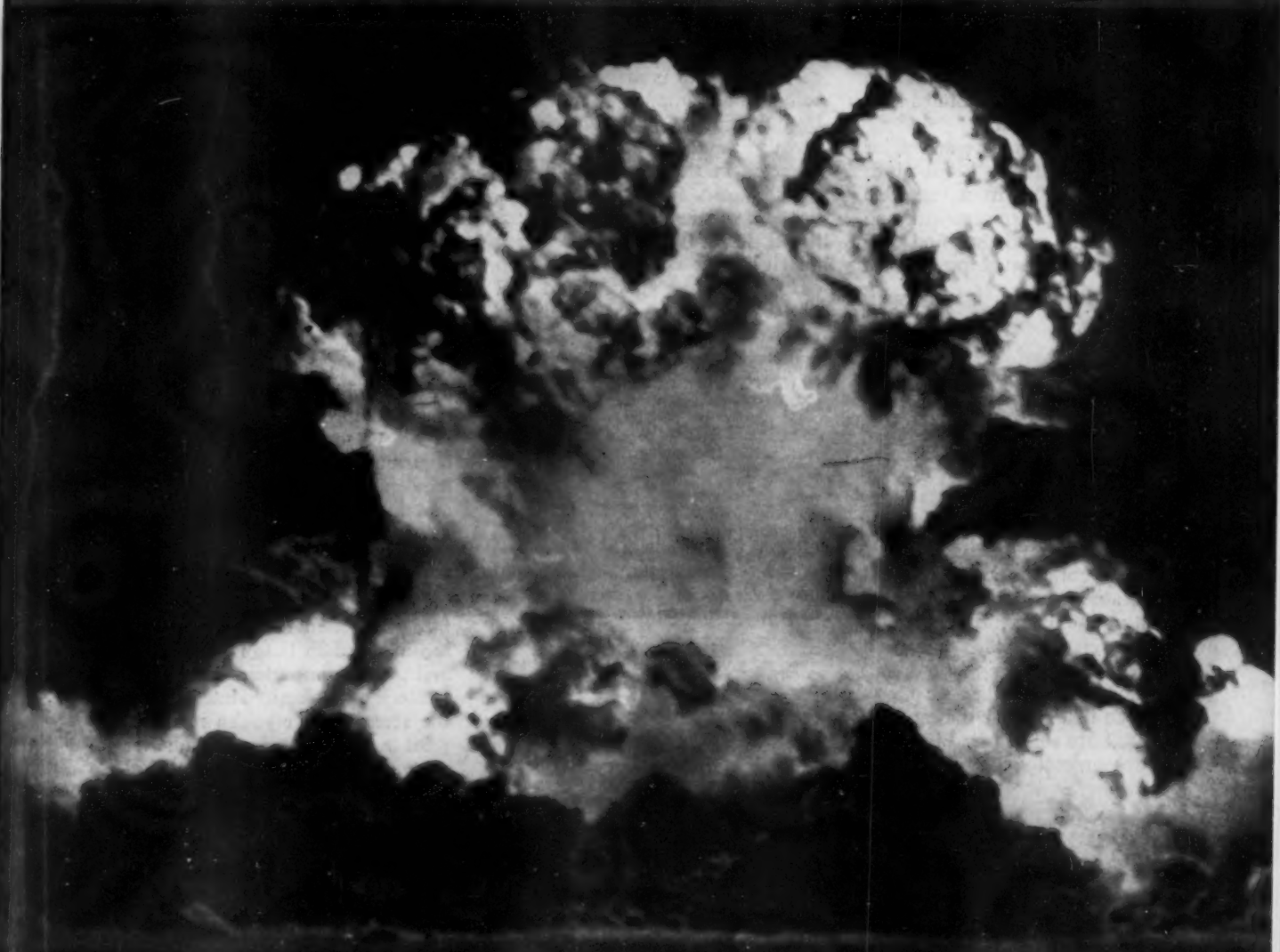
THE WEEKLY SUMMARY OF CURRENT SCIENCE



"Diagnostic Test"

See Page 195

A SCIENCE SERVICE PUBLICATION

Kodak reports to laboratories on:

Stripped lard and vitamin E . . . teaming x-rays with the microscope . . . a new approach to an old printing process

Vitamin E

The strange lard which we put up in the can below has absolutely no future in the supermarkets. The only sales point in its favor is the fact that it does *not* contain a certain wholesome food ingredient. The missing ingredient is vitamin E, and its removal to less than 5 micrograms per gram of fat (accomplished by molecular distillation, a specialty of the house) is a service we perform for those who want to see what happens to creatures kept alive without vitamin E.

It so happens that we are major producers of vitamin E (obtained not from lard but from vegetable oils) for the pharmaceutical and feed industries, and thus find ourselves in the unusual position of

trafficking both in a commodity and in the absence of that same commodity. The latter, of course, is small business, but there *is* a good deal of research going on about vitamin E. Over 600 scientific papers on work in this field during 1950 and 1951 are summarized in a bibliography recently compiled in our laboratories.

Volume II, Annotated Bibliography of Vitamin E, 1950 and 1951, *is available from The National Vitamin Foundation, Inc., 150 Broadway, New York 7, N. Y.*

A hermetically sealed tin containing 400 grams of stripped lard is available at $2 from Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Microradiography

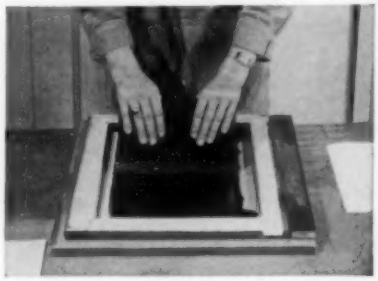
Of the total film acreage that we produce for the finding of voids, fractures, porosities, inclusions, and other defects in man, metal, and beast, an infinitesimal fraction is used in the sub-technique of microradiography. This is in effect two-stage x-ray photomicrography: a film or plate of high resolution is exposed to x-rays through a thin specimen section and then an optical enlargement is made of the resultant radiographic image. Thus by differential x-ray absorption is revealed the distribution of various elements in the microstructure of the specimen. For accurate identification, it is helpful to employ the line-emission from the tube target, but it is not convenient to keep changing targets in order to find the sets of line-emissions desired. Furthermore the continuous spectrum plays a distracting *obbligato* to the nice, clear-cut relations of *K*-emissions and absorptions.

Unworried by the knowledge of how little the consumption of materials for microradiography contributes to their salaries, a few of our research people have been attacking this problem and have just put out a paper that tells how to use a variety of dependably homogeneous *K*-radiations from interchangeable x-ray fluorescence targets that you can put in an attachment for your low voltage x-ray tube.

Anyone who wants to make one like it can get a reprint from us of the paper, "Application of Fluorescence X-rays to Metallurgical Microradiography." Write X-ray Division, Eastman Kodak Company, Rochester 4, N. Y.

Silk screen

Should you want to reproduce just about any kind of pattern in just about any kind of medium on just about any kind or shape of surface, you ought to look into the new Kodak Ektagraph Process. You start with an image on film or plate and some 20 minutes later Copy No. 1 is ready to dry. Your total outlay



for all the equipment and supplies for a uniquely versatile printing plant that you can store in a desk drawer needn't exceed the cost of a decent pair of shoes. This represents our contribution to silk screen printing, one of the oldest forms of the art of printing, wherein the material which serves as the ink is squeezed through permeable areas in a silk screen. Specifically, our contribution is a film that can be handled by incandescent room light and incorporates its own tanning developer. After exposure and immersion in the processing solutions, the unexposed gelatin washes away in warm water, the film is placed face down and dried on the silk screen, the film base is peeled off, and the gelatin pattern dries down to block off the desired interstices in the screen. Then you're ready to print a complex circuit in silver paste, an instrument dial, an illustration for a monograph, or a portrait of an ancestor on a shaving mug. Preserves fine detail, too.

Kodak Ektagraph Film is sold by Kodak Graphic Arts dealers, and full information about it is available from Eastman Kodak Company, Graphic Arts Division, Rochester 4, N. Y.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . *serving laboratories everywhere*

Kodak

PHYSICS

Shudder at Old-Hat Bomb

"Most horrible book ever written" is preview of possible events in a trigger-happy world. "Diagnostic test" of smaller atomic weapon gave top consideration to civil defense.

See Front Cover

By WATSON DAVIS

Special coverage of the March 17 atom bomb exploded at Yucca Flat, Nev., as written by the director of Science Service.

▶ YOU HAVE not read, in all probability, what one expert described as the "most horrible book ever written." It was officially published nearly three years ago and its title is "The Effects of Atomic Weapons."

Even though it is pre-hydrogen bomb and based largely on what happened to two Japanese cities, Hiroshima and Nagasaki, it is a preview of what might happen anywhere in a trigger-happy world.

Now those charged with civil defense for a blase and "it can't happen to me" population have watched the book go into dramatic, full-scale production with just a tiny, two-house sample against which an atomic bomb was loosed. The observers, most of them, shuddered as their imaginations applied what could happen to the cities from which they had come.

The kind of bomb shown again to the nation, via press, radio and television, on Yucca Flat, and pictured on the cover of this week's SCIENCE NEWS LETTER, was a bit old-hat. Eniwetok is the place they let loose the really big ones nowadays, the hydrogen ones.

But out-moded or not, the A-bomb is something to ponder and fear. There is not much chance of human survival within a mile of the atomic blast. The atomic rescue efforts will have to be made by people who live ten or more miles away. Atomic civil defense that is selfishly concentrated upon one's own city alone will be wasted largely if your city is target zero.

A great show: If only it were not a prologue to possible tragedy.

The March 17 dawn "Saint Pat" atomic explosion in many ways duplicated the world's first atomic "trinity" explosion at Alamogordo, N. Mex., July, 1945.

Not really a bomb in the sense of a military weapon, it was a "nuclear diagnostic test" in AEC language as was the famous first.

The explosion occurred at the top of a steel tower which was completely vaporized as the ball of fire touched the ground, and may have dug a radiologically hot crater.

Rising at dawn like a sudden supersun flash, colorations lacking in recent day explosions were seen. The persisting violet after-glow was due to gamma, or X-ray-like, radiation affecting the nitrogen and oxygen of the air.

Incongruous sounding, nevertheless the glorious white of the mushroom cloud was due to ice particles forming where seconds before were hottest earthly temperatures, about a million degrees.

The March 17 explosion can shake people out of complacency, just as it jarred the two typical houses, over 50 autos and numerous dummies standing in for you and me if sudden atomic attack comes. That's why civil defense was a top consideration in this test.

If you are caught in your auto during an A-bomb alert, be sure to leave your windows open. In the test explosion, autos one and three-quarters and two miles away had their tops dished in when they had closed windows. The smashing-in of the top would have broken the necks or bashed in the heads of occupants. Autos with open windows did not suffer such damage. No windows were broken or tires flattened so far out.

Closer to zero position of the shot, cars were turned over, moved many feet and some set afire.

Typical frame houses at 3,500 feet, about three-quarters of a mile, and 7,500 feet were badly damaged. The house closer in was completely wrecked, dumping debris on air raid shelters in its basement. The most distant house was so damaged as to be uninhabitable without major repairs, with windows, furniture, plaster and dummy inhabitants strewn over weakened floors.

It was probably the world's 40th atomic bomb that exploded as a public show on Yucca Flat.

The serial numbers upon the bombs are a bit vague because the U. S. and Russia have both not told everything that has happened.

For instance, how many hydrogen or other bombs were exploded at Eniwetok last fall in what were officially announced as experiments contributing to hydrogen bomb research? Suppose we guess at about five. Suppose we conservatively (and wishfully) estimate that Russia has made only the three explosions announced by the United States.

That gives us the 40 figure, which may well be too low by five or 10 or even more.

Less important than the number of bombs tested are the number of bombs manufactured and in storage in the United States and Russia. It must be 10, or 20, or more times the number that have exploded. That is, the bombs in existence must be a thousand or two. Most of these are plutonium or fission A-bombs, such as that exploded for demonstration purposes March 17.

The hydrogen bombs being developed and perhaps ready in small quantity are bigger, so much so that one H-bomb is equal to 10 or 100 of the older A-bombs.

It is possible that continental United States is too small to see safely a hydrogen bomb explode. We hope the Russians agree with that statement.

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A-BOMBED HOUSE—Only 3,500 feet from Target Zero, this once-typical frame house was completely demolished, as shown in this picture taken with telephoto lens. Tower at left supported cameras.

DENTISTRY

Tooth Decay Theories

➤ ANOTHER MONKEY wrench has been tossed into the already confused puzzle over the real cause of tooth decay.

The latest addition to the muddle comes from Drs. William E. Hutton and T. D. Lewis of the University of California College of Dentistry.

One of the leading theories of tooth decay holds that certain bacteria, primarily *Lactobacillus acidophilus,* produce an acid which causes caries. The bacteria thrive in their own acid, and "eat" their way deeper into the tooth.

A part of this theory holds that we get some protection from "friendly" bacteria in the saliva. These "friendly" salivary bacteria fight the caries-producing bacteria.

The two California researchers have found evidence suggesting that just the opposite process may also take place. That is, the caries-producing bacteria may fight back, holding down the growth of the "friendly" salivary bacteria.

The findings were made in experiments with a strain of actinomycetes, a kind of bacteria which has been observed to create caries-like lesions in hamsters. The actinomycetes were found capable of inhibiting the growth of "friendly" bacteria in saliva.

Dr. Hutton said the work is another demonstration that present theories of tooth decay are too simple. Tooth decay, he says, is actually much more complex than these theories allow for. The possibility of alkaline as well as acid breakdown, tooth structure, the individual's condition and environment, the interrelationships of bacteria—these are some of the things that must be fully understood.

Dr. Hutton added that the saliva, the composition of which is strongly influenced by the physiological and psychic condition of the individual, and the diet, which is related to environment, may be the dominant influences in tooth decay.

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PUBLIC HEALTH

Chest X-Rays for Men

➤ MEN OVER age 35 should have regular periodic X-ray examinations made of their chests. The object is to detect lung cancer at its early stage when chances of cure are best.

Lung cancer is on the increase. For men over 45 it far outranks tuberculosis of the lungs as a cause of death. While men are the chief victims of this form of cancer, women are being attacked by it more frequently today than 20 years ago.

Commenting on this increase, statisticians of the Metropolitan Life Insurance Company say that it is hard to account for or even to determine how much of the increase is real. Improved techniques for diagnosis and their much more frequent use, and more physicians trained in this field have probably led to many cases being detected and reported which in the past would have been overlooked.

The search for the cause or causes of the increase in lung cancer is being pushed. Radioactive materials and some chromates are known to cause lung cancer in experimental animals and in men in certain occupations.

"On the other hand, the suggestion that the increase in air pollution may be a factor is unsupported by any real evidence," the statisticians state.

"The role of other factors such as coal tar products, excessive tobacco smoking and specific contaminants is still far from conclusive."

It will be a long time, the statisticians say, before studies showing the effects, if any, of environment can give conclusive results.

Controlling the disease, therefore, depends on "continuing popular education in the symptoms of the disease and the promotion of measures for early detection and treatment."

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CLIMATOLOGY

Oceanic Mud Shows Cold Weather Ahead

➤ FROM THE depths of the ocean floor comes evidence that our climate, bad as we may already think it, will get worse before it gets better.

A century or two of deteriorating weather was forecast to the Royal Society by Dr. J. D. H. Wiseman of the British Museum of Natural History, on the basis of information gleaned from cores of mud gouged out of the sediment on the ocean beds. In such cores scientists find evidence of the climate of bygone days showing a more or less cyclic fluctuation of temperatures.

Having charted these records of past atmospheric temperatures and noting their rhythm, Dr. Wiseman predicts that in the next hundred years or two our climate will grow steadily colder.

One way scientists decipher bygone weather records from cores of ocean mud is to judge the abundance of pinpoint-size seashells at each level in the core. These shells are the fossil remains of tiny one-celled animals, the *Foraminifera,* the same creatures whose shells piled up through the ages to form the vast chalk beds of Mississippi and Georgia.

The *Foraminifera* live largely on the surface of the ocean. As they die their shells sink to the ocean floor along with other sediments. They flourish in periods of warm weather, become scarcer when the climate changes for the colder.

Therefore, layers of sediment in the core which contain an abundance of *Foraminifera* shells record periods of warm weather, and vice versa. Scientists are able to correlate the various layers in the core quite closely with recent and distant historical and geological ages and can thus chart chronologically the changes in the earth's climate.

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PUNCHED TAPE CONTROLS—A complete flight can be flown with such a punched tape giving orders to a robot autopilot designed by Minneapolis-Honeywell engineers.

TECHNOLOGY

Keep Planes on Time

➤ A ROBOT autopilot that makes sure a plane arrives at its destination within a "particle of a minute" of its scheduled arrival has been developed for the Air Force, the Air Research and Development Command announced in Baltimore.

The robot is designed to pilot a heavy plane from take-off to landing on a coast-to-coast trip without human hands ever touching the controls.

The Air Force said the Minneapolis-Honeywell autopilot is part of long-range planning for the day when automatic control and aircraft scheduling will be necessary in flight navigation.

Airports are becoming so clogged with traffic that soon it may be necessary for a plane's landing to be cleared at the destination before the plane can even begin the trip, the Air Force explained. The autopilot may help make flight scheduling much more precise by guaranteeing that the plane will land at the proper minute.

From runway taxiing to landing, the plane's flight is coded on punched paper tape. The tape is fed into an electronic "brain" about the size of a large video set. Carried on the plane, the "brain" works something like a player piano and feeds information from the tape to the plane's autopilot and air-speed controls. The pilot can switch from automatic to manual control instantly in an emergency.

By relieving him of the attention to details required for routine flight, the robot lets the pilot devote more time to his other duties as skipper. Currently the device is being tested at Wright Air Development Center, Dayton, Ohio.

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GERONTOLOGY

Ways to Healthier and Happier Old Age Sought

➤ WAYS TO more fun for old people as well as better health, jobs and fewer economic problems will be sought in a new broad program to be started soon at the Harvard School of Public Health with the aid of a $112,688 three-year grant from the W. K. Kellogg Foundation of Battle Creek, Mich.

Because the Harvard School of Public Health feels that there are important relationships between all of the forces which affect the lives of the aged, it welcomes the opportunity to help pioneer an approach to the problems of old age that takes into consideration all of the social, economic and health factors with which the older person must contend, Brig. Gen. James Stevens Simmons, U.S.A. (ret.), dean, said in announcing the new program.

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BIOLOGY

Cells Build New Cells From Simplest Materials

➤ CELLS OF the body do part of their job of building new cells by starting with the simplest materials.

Unlike a woman making a dress who cuts out ready-made material and sews it together with the aid of a pattern, the cell first tears down the material to the very threads, as it were, and then weaves them directly into the finished product.

This is true at least for the cell's production of an enzyme, made by the cell to convert its food into living matter.

This finding, contrary to previous theory, and believed an important clue to the secret of cell growth, including cancerous growth, was made by Prof. Sol Spiegelman and Dr. Harlyn Halvorson, microbiologists of the University of Illinois.

Since doing this work, Dr. Halvorson has become associated with the University of Michigan.

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ICHTHYOLOGY

13 Fatherless Fish Born—All Females

➤ THIRTEEN FATHERLESS fish have been born in a London laboratory, all seemingly authentic cases of "virgin birth," or parthenogenesis, Dr. H. Spurway of University College, London, reports in *Nature* (March 7).

All of the 13 guppies are females, too, backing up the probability of their being fatherless, Dr. Spurway added. Parthenogenetic offspring of higher animals must be females, because the inheritance factor for males is absent in the unfertilized female's egg cell or ovum.

In two of the cases described by Dr. Spurway, the female guppies were isolated from adult males when they were 12 and five days old respectively. The first gave birth to a single female 212 days later. The second gave birth to three females 188 days later.

The first of these guppies was with adult males during the first 12 days of her life, and with immature males for a few days afterwards, so there could be a possible chance for fertilization in this case, Dr. Spurway said. But not so with the second.

She was with her immature brothers only the first five days of their lives. Her brothers, however, showed no signs of sexual differentiation until they were 38 days old.

Even if the brothers had developed sperm early, Dr. Spurway said, it is difficult to see how the female could have been fertilized. Guppies are internally fertilized, the males using specialized fins as intromittent organs. But with the five-day-old brothers, these fins were still unmodified when the female was removed.

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CHEMISTRY

Watch These Signs to Spot Bomb Detonation

➤ WHICH FISSION products and atomic fragments of the bomb case tell observers that an A-bomb has been exploded were reported to the American Chemical Society meeting in Los Angeles by Dr. L. R. Bunney of the U. S. Naval Radiological Defense Laboratory in San Francisco.

Working with Dr. N. E. Ballou, and using both experimental and theoretical data, Dr. Bunney concludes that uranium and plutonium would be found in air samples as evidence of such an explosion, and that there would also appear as fission products elements from zinc through gadolinium in the periodic table.

Most fission products would be in the form of oxides by the time they had cooled to ordinary temperatures, Dr. Bunney said, although a number of other combinations would be possible. Nitrogen resulting from the explosion would be uncombined, as would the rare gases. Silver, he believes, would be found as a metal.

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TECHNOLOGY

Antifreeze Speeds Synthetic Rubber

➤ SYNTHETIC RUBBER for automobile tires and military equipment now can be mixed up in a big "heat exchanger" vat resembling an ice cream freezer in about 20 minutes, using new formulas and techniques described to the American Chemical Society meeting in Los Angeles by U. S. Rubber Company scientists.

In pilot plant tests, the process replaces a tedious 12- to 14-hour production rate now widely used in government-owned plants making GR-S synthetic rubber.

The secret of the process lies in removing heat as the chemicals react inside the vat to form "cold" rubber. A coolant, similar to methanol antifreeze, was used to carry off the heat of chemical reaction inside the big vessel. The resulting liquid synthetic rubber latex then could be processed into solid form by conventional methods.

Success of the pilot plant tests, conducted at the Naugatuck Chemical Division's synthetic rubber plant in Naugatuck, Conn., indicates the process may be adaptable to full-scale production, the scientists reported.

The B. F. Goodrich Company, working on the project under Reconstruction Finance Corporation sponsorship, previously has announced its findings on a similar process in which the synthetic is made in a tube-like affair. Rubber made in these pilot plant runs now is being tested to reveal its quality.

The GR-S synthetic rubber is particularly suited to automobile tire treads. It is believed to be generally about 20% better than natural rubber in this application.

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CHEMICAL PRESERVING METHOD—A cheap method of treating fruits and vegetables after harvest to cut down on spoilage losses is being worked out by E. B. Oyer and E. G. Sharvelle of Purdue University, Lafayette, Ind. Vapors from volatile trichloroethylene and tetrachloroethylene are being tested as chemicals to cut mold losses when marketing highly perishable peaches and strawberries.

METEOROLOGY

Speed Forecasting Time

➤ A WEATHER forecast which would take one weatherman with a desk calculator one year to do can now be done by an electronic computer in 36 minutes.

The forecast is actually for the flow of the atmosphere over the United States east of the Rockies, being done by the new weather predicting method called numerical forecasting. For the first time, Dr. Jule Charney of the Institute for Advanced Study at Princeton revealed at a meeting of the American Meteorological Society in Atlantic City, N. J., a three-layer forecast for this area has been fed into the extremely fast "electronic brain" at the Institute.

A human forecaster can only hold in his mind a general picture of the weather, while the electronic brain can hold in its memory organs specific information about atmospheric pressure and other weather data at hundreds of separate points in the atmosphere.

The human forecaster uses his general picture, plus what he knows about weather processes, to make a big jump into the future—a jump of 24 hours. The electronic brain uses its information about the weather, plus certain mathematical formulas that describe weather processes, to predict what will happen in one hour. Then it jumps from hour to hour until it gets a forecast for 24 hours ahead.

Originally, numerical forecasts were made for a two-dimensional square at one altitude in the atmosphere. Then the meteorology section at the Institute proceeded to two horizontal slices of the atmosphere. Now, they have fed into the machine the first forecast problem using three slices. The upper limit will probably be five or six slices, Dr. Charney said.

At the same meeting it was revealed that some modification of the formula used in numerical forecasting on a 24-hour basis may be used in predicting the weather over long periods of time. Philip F. Clapp of the U. S. Weather Bureau said that, when the numerical method is used to predict weather five days or a month ahead, large scale heat and cold sources will probably have to be taken into account.

He based this observation on work he had done in long-range forecasting by the numerical method at the University of Stockholm.

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CHEMISTRY

Sun, Cerium Split Water

➤ WATER CAN be split into the two gases that compose it by merely dissolving in it compounds of the element cerium and setting the solution in sunlight.

This simple substitution for a task formerly needing an electric battery was described to the American Chemical Society meeting in Los Angeles by Drs. Lawrence J. Heidt and Alan F. McMillan of the Massachusetts Institute of Technology.

The green leaves of plants have until now held the secret of direct use of energy from sunlight. A number of chemical processes, such as the darkening of silver salts which makes photography possible, also make use of the sun's energy, but the process is not reversible.

In the new application to the compounds of cerium Drs. Heidt and McMillan have applied the sun's energy to start a chemical seesaw. Each stroke of this seesaw's double action throws out one of the gases which, when combined, form water.

Cerium is one of the more abundant of the so-called rare earth elements. Its presence in the friction wheel of cigarette lighters causes the spark that ignites the lighter fluid. An earlier use for the element, in the form of its oxides, was in mantles for gaslight flame.

The new application for cerium which Drs. Heidt and McMillan are studying employs two compounds, cerous and ceric perchlorates. The cerous compound, the scientists have discovered, can make use of energy it absorbs from sunlight to combine with oxygen to become ceric perchlorate, and set free hydrogen, which they have detected being given off. At the same time, ceric perchlorate by the aid of sunlight can be reduced again to the cerous compound, giving off oxygen in the process.

The two chemical reactions go on at the same time in the same solution, the M.I.T. scientists find. The net result is the breaking up of water into hydrogen and oxygen with nothing but sunlight furnishing energy to this simple form of "battery."

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TECHNOLOGY

Roof Framing Technique Speeds House Building

➤ A ROOF framing method that speeds construction of one-story houses has been adapted to work on houses of one and a half stories. Called clear span framing, it permits rapid closing-in of the structure so that work still can go on during bad weather. It also lets the upper story of the house be used without load-bearing partitions on the lower floor.

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LARGEST FRESH WATER FISH—Edward Migdalski of Yale University, flanked by two Macushi Indians of British Guiana, exhibits the 148-pound Arapaima gigas he caught with the 12- to 15-pound line he is holding.

• RADIO

Saturday, April 4, 1953, 3:15-3:30 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS Station.

Philip Clapp and Dr. Joseph Smagorinsky, meteorologists of the U. S. Weather Bureau, discuss "Computing the Weather."

CHEMISTRY

Lead in Gas Removes Cylinder Wall Deposits

➤ WHAT HAPPENS to the lead that goes into an automobile with the "ethyl" gas has just been discovered.

Tiny lead-containing particles act as scavengers inside the cylinders. They fly about as the gasoline is burned, leaving one spot, alighting briefly on another. Their action tends to remove deposits of gasoline and oil residues by converting such material to more volatile forms.

These findings came from a study of radioactive lead incorporated into the tetraethyl lead widely used as an additive in gasoline. The research was carried out by Drs. H. P. Landerl and Bernard M. Sturgis, chemists with the Du Pont Company, and reported to the American Chemical Society meeting in Los Angeles.

By putting X-ray film over the deposits on the inside of automobile cylinders in which gasoline containing radioactive lead had been burned, they made the lead show where it goes. In a series of such pictures, the chemists could follow the formation of the cylinder deposits. The lead finally appears around the exhaust valves, the Du Pont chemists said.

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METEOROLOGY

Figure Where Sun Shines on New Homes

➤ YOU CAN now predict how much sun is going to shine, directly or indirectly, on the walls of your new house.

Two Massachusetts Institute of Technology weathermen have figured out a mathematical formula for computing the average direct and diffuse radiation on vertical and inclined surfaces in various places in relation to the sun, taking into account the factor of cloudiness. T. F. Malone and D. G. Friedman reported the formula to the meeting of the American Meteorological Society in Atlantic City, N. J.

They divide the percentages of possible sunshine into three classes. The frequency of occurrence of each class is related to the number of clear, cloudy and partly cloudy days and to the monthly average percentage sunshine. The work was done at the Blue Hill Observatory, Milton, Mass., but the scientists say it can be extended to other areas.

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SURGERY

Operation Remedies Disfiguring Condition

➤ GOOD RESULTS with a new operation for the disfiguring and depressing condition, lymphedema or elephantiasis as it is sometimes called, are reported by Dr. Gerald H. Pratt of New York in the *Journal of the American Medical Association* (March 14).

The condition is one in which tissues are abnormally swollen due to inadequate drainage of lymph fluid. "Milk leg" is one example given by Dr. Pratt. In some cases the swelling is so great that patients ask to have the leg amputated. Some have committed suicide.

Dr. Pratt's operation consists, essentially, in stripping off the top layer of skin with a special electric machine. All the rest of the tissues down to the muscle are then removed. The skin strips are stitched together, cut to a cellophane pattern like that for a skin tight pants leg, and grafted back in place. Pressure dressings and blood transfusions are also used.

Besides reporting good results in 25 cases, Dr. Pratt suggests use of the technique for correcting disabling multiple superficial tumors, dead tissue resulting from burns, extensive post-thrombotic swelling and war injuries.

Science News Letter, March 28, 1953

INVENTION

To Cut Tooth Decay: Fluorine in Chewing Gum

➤ A CHEWING gum designed to reduce tooth decay, particularly in small children, has been patented by Frederick G. Merckel of Montclair, N. J., and Laszlo Reiner of Bloomfield, N. J.

The chewing gum, which may save Junior many a painful trip to the dentist, contains tiny amounts of fluorine, a chemical that combines with chemicals in the teeth to make them resistant to decay. The inventors say a stick of the gum a day should do an effective job of building good teeth.

Like other fluorine treatments aimed at cutting tooth decay, the fluoridated gum works best on children about four years old whose teeth are still forming and hardening. It is designed to coat the tooth enamel with a small amount of fluorine. It also supplies the body with fluorine dissolved in saliva. By normal bodily functions, this dissolved fluorine is carried to the teeth and dentin, giving even more protection.

The fluoridated gum requires a special base. Chemicals in the base of most commercial gums will combine with the fluorine and "block" it from being dissolved in saliva.

At present, teeth can be fortified with fluorine against decay by two methods: they can be coated with fluorine by qualified dentists, or they can be "treated" with fluorine consumed in drinking water containing the chemical.

By chewing a stick of fluoridated gum a day under a dentist's prescription, the child can get a satisfactory amount of fluorine which, the inventors say, should help to reduce tooth decay.

The inventors assigned their patent, number 2,627,493, to Wallace and Tiernan Products, Inc., of Belleville, N. J.

Science News Letter, March 28, 1953

CHEMISTRY

Blood Prints Give Fast Poison Diagnosis

➤ HOW A new blood test revealed which of two sick babies had swallowed the contents of the aspirin bottle was told to members of the American Chemical Society meeting in Los Angeles.

The chemists learned of "drug prints" made by shining invisible light through extracts of the patient's blood. Each drug shows a characteristic pattern in this test, reported by Drs. James W. Brackett, Jr., and Lowell W. Bradford of the Santa Clara County Laboratory of Criminalistics, San Jose, Calif. A research grant from the National Institutes of Health aided the development of this rapid lifesaving test.

Needing only a small amount of blood, a few hours of time and an ultraviolet spectrograph, the analyst makes extracts of the patient's blood, using three organic solvents that are acid, neutral and alkaline in their properties.

Patterns that are unique for each drug show up when ultraviolet light is absorbed by each of the three extracts. The combination of these patterns pinpoints the unusual substance in the blood, and appropriate antidotes can be given promptly. Older methods of analysis often required days before this information could be obtained.

Science News Letter, March 28, 1953

MARINE BIOLOGY

Whalers Head Home With Catch of Blues

➤ GRIZZLED WHALERS are heading back to home port now that the 75-day open season on Antarctic whales has come to a close. International regulations permitted the whalers to take 16,000 toothless whales, mostly blue whales, from the Antarctic during the season that began Jan. 2.

Whaling operations in the Antarctic usually account for 90% of the total world output of whale oil, reports the U. S. Department of Agriculture.

Vessels from seven nations took part in the Antarctic whaling this season: Norway, the United Kingdom, Union of South Africa, Japan, Panama, the Netherlands, and the Soviet Union. Oil production from the toothless whale catch is expected to be around 383,000 short tons.

Science News Letter, March 28, 1953

IN SCIENCE

METEOROLOGY

Warmer to Mid-April Predicted for West

➤ THE WESTERN half of the nation, except for right along the coast, will have a warmer spring than usual, the Weather Bureau's extended forecast section predicts for the period ending April 15.

The West Coast and the eastern half of the nation will find the period about as usual so far as temperature is concerned, but near the Great Lakes, temperatures will be below normal.

More rain than usual is predicted for the Ohio valley eastward to what the bureau calls "the middle and north North Atlantic states." Also, the West Coast can expect more than the normal amounts of rain. Except for some deficiency in the Northern Plains and over the Southwest, the rest of the nation can expect seasonally normal amounts of rain until mid-April.

Science News Letter, March 28, 1953

BIOCHEMISTRY

Nine Chemicals To Digest Fat

➤ NINE SEMI-LIVING chemical substances known as enzymes must work in unison to allow you to digest fat.

How the body can break down fatty acids consumed as food and convert them to its own needs has long been a puzzle. The solution was announced to the meeting of the American Chemical Society in Los Angeles by Dr. David E. Green of the University of Wisconsin Enzyme Institute.

Heading a team of eight research scientists, Dr. Green described how this new information on one of the body's fundamental chemical processes will aid in understanding what goes wrong in diseases such as diabetes and cancer.

The enzymes necessary for utilization of food chemicals are found in microscopic rod-shaped structures around the nucleus of cells in the body. From these structures the Wisconsin scientists have succeeded in separating the nine essential enzymes. Six of the nine had never been isolated before, and of these one proved not only novel but unexpected. The Wisconsin research team described it as a compound of a previously unknown kind of flavin, deep green in color, and playing the most important part in the digestive process.

Fatty acid digestion is in some ways similar to the previously known, but less complicated, breakdown of sugar in the body. The new discovery completes understanding of one phase of the chemistry of life.

Science News Letter, March 28, 1953

E FIELDS

BIOCHEMISTRY

Germanium Needle Aids Radio Gold Treatment

➤ GLASS-LIKE NEEDLES that carry radioactive gold to the place where it is needed, then dissolve in body fluids, leaving the gold in place, were described by Drs. H. C. Dudley and T. G. Mitchell of the Radioisotope Laboratory of the U. S. Naval Hospital, St. Albans, N. Y., to the American Chemical Society meeting in Los Angeles.

The needles which dissolve harmlessly in the body are made of the fused oxide of germanium, a chemical element for which uses are just beginning to be found. This is the same element used for the transistor, small-sized substitute for the electron tube in radio circuits.

Chemically similar to silicon, the glass-making element, germanium forms an oxide which, like glass, can be drawn out into a thin sharp sliver. Gold can be imbedded in this "needle" and then irradiated to produce the isotope 198, used in study of cancer. The needle can then be inserted under the skin, where the gold is wanted. The germanium has little effect on the body because it is not poisonous, has little radioactivity and is rapidly dissolved and eliminated.

Science News Letter, March 28, 1953

MEDICINE

Glandular Fever Counters Leukemia

➤ A BOUT of glandular fever may help some patients with acute leukemia, at least temporarily.

This is suggested by Dr. A. W. Taylor, pathologist at the Kent and Sussex Hospital, Tunbridge Wells, England, in the *British Medical Journal* (March 14).

Dr. Taylor cites six cases of the malignant blood disease, in four of which temporary improvement, or "remissions," of varying degree seemed to follow infection by glandular fever. In the first case the infection was acquired accidentally. Following this leukemia patient's improvement, which was great enough to allow him to go back to work, Dr. Taylor deliberately gave glandular fever serum to five more patients.

Two of these failed to get glandular fever and their leukemia ran the usual rapid and fatal course. The other three had remissions, though all eventually died of the leukemia.

"It would be obviously most unwise to draw any sweeping conclusions from this very small series of cases," Dr. Taylor states. He thinks, however, that the improvement in the patients' conditions and blood pictures were more than could be explained either by the blood transfusions some got or by chance. He feels further trial of the glandular fever treatment is "justified."

"It is even possible," he states, "that in suitable cases the effects might be more profound and lasting than in those described."

Science News Letter, March 28, 1953

ASTRONOMY

Fast-Moving Asteroid Comes Close to Earth

➤ THE FAST-MOVING asteroid, spotted March 9 in the northeastern sky, is slowing down, but its motion is still unusually large, Dr. Leland Cunningham of the University of California has found after computing the object's orbit.

Besides its speed, another reason for unusual interest is the asteroid's close approach—in millions of miles—to the earth. This was indicated by its great angular velocity (see SNL, March 21, p. 180), but astronomers have not yet computed exactly how close to the earth the asteroid was.

Science News Letter, March 28, 1953

MEDICINE

Big Cancer Weapon Better Than Hoped

➤ ONE OF medicine's big guns against cancer, the two million volt X-ray generator at the Massachusetts Institute of Technology, Cambridge, has brought results surpassing the expectations of Prof. John Trump of the Institute, Dr. Hugh F. Hare of the Lahey Clinic who is in charge of the treatments, and the American Cancer Society.

No effort has been made to estimate the cure rate because less than five years have passed since the machine was first used in treating patients. But 293 of the 455 patients treated between October, 1949, and October, 1952, are reported without apparent disease symptoms. The American Cancer Society announced the following statistics:

"Without evidence of disease were 12 of 25 patients with cancer of the bladder, 13 of 26 brain cancers, 9 of 21 breast cancers, 23 of 32 uterine cervical cancers, 9 of 21 cancers of the esophagus, 17 of 21 cancers of the larynx, 2 of 2 liver and spleen cancers, 17 of 37 lung cancers, 25 of 39 lymphoid tumors, 2 of 2 pancreatic cancers, 8 of 15 stomach cancers, 37 of 50 thyroid cancerse, 2 of 2 uterine cancers, 2 of 3 kidney cancers and 8 of 8 parotid gland tumors.

"The figures are particularly impressive in the light of the advanced stage of many cases, many of whom had received no benefit from other types of treatment. Several types of cancers, such as of the lung, stomach and pancreas, have very low rates of cure by any means."

Science News Letter, March 28, 1953

GENERAL SCIENCE

Fellowships Untaxed In Proposed House Bill

➤ A BILL has been introduced into the House of Representatives which would reverse an Internal Revenue Bureau ruling that millions of dollars given by foundations to individuals for research and study is taxable as income.

The ruling is also being fought in the courts by some of the recipients of these gifts, such as the John Simon Guggenheim Memorial Fellowships. The bill, introduced by Congressman Richard M. Simpson (R., Pa.), would classify as gifts, and therefore tax-free, amounts paid to an individual by an educational organization or foundation for education, training, research or creative activity.

As a result of the Internal Revenue Bureau ruling, the Guggenheim Foundation had to pay more than $250,000 extra to between 300 and 350 scientists, artists and writers who had already received grants on a tax-free basis. Since the ruling, the foundation has been able to grant far fewer fellowships.

"The effect of the bill would be to increase substantially the effectiveness of the policy of the foundations of granting fellowships. More fellowships could be awarded if the approximately 25% now paid in taxes were available for other fellowships," Rep. Simpson said.

Joseph Barker, president of the Research Corporation, which in 1952 made some 258 grants for scientific research and study, pointed out that, with one hand, the government taxes such grants, while with the other hand, it pays out money for fellowships through the National Science Foundation.

Science News Letter, March 28, 1953

INVENTION

Commercials Play When Music Stops

➤ A COMPLICATED electric gadget that may delight advertisers and make "innocent bystanders" scream in pain has been awarded a patent.

It plays commercials on juke boxes when the music stops.

A letter recently published in a national magazine begged somebody please, please to make a "silent" record for juke boxes so you could buy three minutes of quiet for a nickel. To that letter writer, this news will come as a blow. For when no one is playing the juke, the gadget goes into action and fills the silence with commercial advertisements.

"In this manner, new revenues may be obtained from the idle phonograph," inventor Sverre Rasmaussen of New York candidly states.

The gadget received patent number 2,627,415.

Science News Letter, March 28, 1953

ASTRONOMY

Saturn Is Evening Planet

Venus disappears from view during the coming month. Low in the west, many of the brilliant constellations of winter are now making their last stands.

By JAMES STOKLEY

➤ THE CONSTANT drama of the skies brings a new actor into the center of the celestial stage during April. This is Saturn, which is seen to the southeast in the constellation of Virgo, the virgin.

A little below and to the right of the planet is the star Spica, about half as bright. Higher and farther left, however, is Bootes, the bear-driver, with the brilliant star Arcturus, which is about 20% brighter than the planet Saturn.

The planet, which shines by reflected illumination from the sun, has a steadier light than the glowing and distant stars, which show the characteristic twinkling of these bodies.

All these objects are shown on the accompanying maps, which depict the heavens as they appear around ten o'clock, your own kind of standard time, at the beginning of April, about nine at the middle of the month and eight at the end.

At midnight between April 13 and 14, Saturn will be in opposition—that is, directly opposite—to the sun. This means that it is near the eastern horizon about sunset and near the western horizon about sunrise, thus remaining visible through the night.

Venus Not Visible

Venus, on the other hand, which has been so conspicuous in the western evening sky during recent months, will be in "inferior conjunction"—between sun and earth—on the 13th. Thus it will both set and rise with the sun, and will not be visible at all.

However, during the first few days of April it may be possible to get a glimpse of Venus, shining brilliantly low in the west as dusk is falling. Perhaps by the end of the month, and certainly by the middle of May, it will be seen low in the eastern sky before sunrise.

Jupiter is still visible and is shown on the maps, low in the northwest in the constellation of Taurus, the bull. He is bowing out, for at the end of April he will set only about an hour and a half after the sun, just as twilight is ending, and in another month he, too, will be gone from the skies of evening.

On April 27, during morning hours, Jupiter will be close to Mars, which remains in the evening sky, though it is only as bright as a second magnitude star, and is not conspicuous.

As April comes and we begin to get well into spring, there is a characteristic change in the stars seen in the evening skies. Arcturus and Spica, which are near Saturn, have already been mentioned. They are taking the place of the brilliant constellations of winter, which are now making their last stand, low in the west. There is Orion, with the three stars in a row forming this warrior's belt, and first magnitude Betelgeuse above.

To the left of Orion is Canis Major, the great dog, with Sirius, the dog-star. Above this is the lesser dog, Canis Minor, with Procyon. Ascending still higher, and to the right, we come to Gemini, the twins, with brilliant Pollux. Castor, the other twin, is alongside, and somewhat fainter.

Vega Can Be Seen

Below this group, and farther right, stands Auriga, the charioteer, with Capella, and below this is Taurus, the bull, in which Jupiter is seen, along with the first magnitude star Aldebaran.

High in the south is Leo, the lion, with the star Regulus. This marks the end of the handle of a smaller group known as the sickle. Still another star of the first magnitude, though it does not look it, is shown low in the northeast. This is Vega, in Lyra, the lyre.

As low as this the absorption of its light by the atmosphere dims it greatly, but later in the night, as it climbs higher, it will shine more brilliantly. During coming months Vega will become more and more conspicuous, until by summer it will stand high overhead, the most brilliant star in the evening sky.

The planet Saturn, now with us through the night, is one of the most interesting of of the heavenly bodies. At a distance from the sun of 886,000,000 miles, compared with 93,000,000 for the earth, it is the farthest of the planets visible to the naked eye, and was the most distant known planet until Uranus was discovered in 1781.

A year on Saturn is equal to about 29.5 of our years, since that is the time it requires for a complete revolution about the sun. It is second only to Jupiter in size, among the planets, with a diameter of 71,500 miles, compared to earth's 7,913 miles.

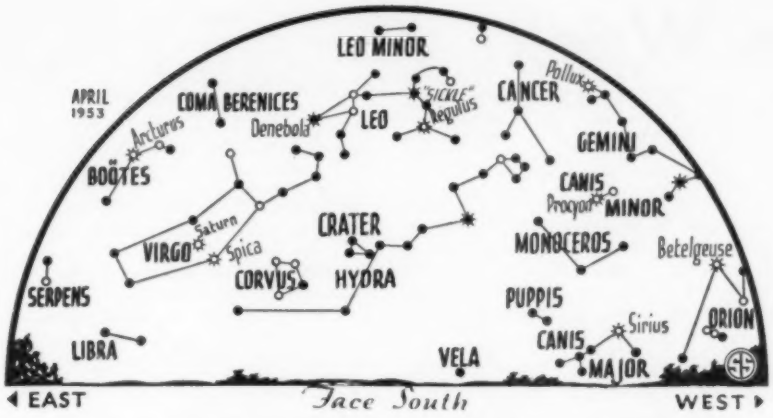
One of Giant Planets

In structure Saturn resembles Jupiter, as well as Uranus and Neptune, which are the giant planets of the solar system. At the heart of the planet there seems to be a rocky-metallic core, less than 30,000,000 miles in diameter. Around this is a layer of ice—a frozen ocean—some 6,000 miles deep. This is surrounded by an atmosphere about 15,000 miles deep, consisting largely of hydrogen, ammonia and methane, which is the chief constituent of natural gas.

Much of the ammonia is condensed into clouds, and what we see when we look at it is the tops of these clouds. We cannot penetrate the dense atmosphere, but studies, with the spectroscope, of the light reflected by the planet's atmosphere tell us something of its composition.

With so much of its volume consisting of atmosphere, Saturn is the least dense of all the planets. Whereas the earth is about 5.5 times as heavy as an equal volume of water, and Jupiter about 1.3 times, Saturn is less than three-quarters as heavy as if it were made of water. If a big enough ocean could be provided, Saturn would float upon it, while all the other planets would sink!

The most amazing feature of Saturn, however, is the ring-system that encircles



☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

the ball. No other planet is so equipped. With an outside diameter of 171,000 miles, the innermost ring is about 6,000 miles above the planet. Yet the thickness of the system is very small, perhaps not more than ten miles. They are much thinner, relatively, than would be a disk ten inches in diameter cut of thinnest tissue paper.

Rings Not Solid

However, the rings are not solid—and if they were they would not hold together. Actually they consist of a swarm of myriads of tiny moonlets, no larger than good-sized rocks, but all going around Saturn together.

The pieces are so small that from the earth we cannot separate them with the most powerful telescope, and the rings look solid, at least until they happen to pass in front of a distant star. Then the star shines through them, giving a clue to their nature.

No one knows exactly what caused the rings, but astronomical theory has demonstrated that within a certain distance of a planet, known as Roche's limit, a satellite could not hold together. The rings are well within this limit of Saturn while the closest of its nine large moons is outside it.

Some have supposed that a tenth moon once ventured too close and was broken to bits to form the rings. Indeed, it is believed that in the remote future our moon will get too close to the earth and suffer a similar fate. However, it seems more likely that the rings of Saturn represent material which, had it been farther out, might have gathered together to form a satellite.

In any event the rings, which are visible with a moderate-sized telescope, make Saturn one of the most beautiful objects to be seen in the heavens.

Celestial Time Table for April

April	EST	
6	11:58 p.m.	Moon in last quarter.
12	2:00 a.m.	Moon nearest, distance 224,100 miles.
13	3:00 a.m.	Venus between earth and sun.
	3:09 p.m.	New moon.
	12:00 midnight	Saturn opposite sun and nearest earth, distance 808,800,000 miles.
15	5:00 a.m.	Mercury farthest west of sun, rises before sunrise.
	11:03 a.m.	Moon passes Mars.
	8:37 p.m.	Moon passes Jupiter.
20	7:40 p.m.	Moon in first quarter.
24	3:00 a.m.	Moon farthest, distance 251,800 miles.
27	11:00 a.m.	Mars passes Jupiter.
	11:00 p.m.	Moon passes Saturn.
28	11:20 p.m.	Full moon.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, March 28, 1953

CHEMISTRY

Rum Taste Told By Chemical Tests

➤ RUM RESEARCH in Puerto Rico has turned up eight "chemical methods" for tasting rum that supplement the personal opinions of tasting panels.

The chemical methods were developed over the last eight years at the University of Puerto Rico's Agricultural Experiment Station, which is expanding the facilities there with the addition of a distilling unit designed by Arthur D. Little, Inc., Cambridge, Mass.

The methods will be used to determine the quality of a test run of rum, advises Victor Rodriguez-Benitez, technical director of the pilot plant. Other tests will be conducted to reveal the suitability of waste products for other purposes, such as making cattle feed or fertilizer from the fermentation mash after the rum has been distilled from it.

Rum making is a multi-million dollar business in Puerto Rico. During a recent four-year period, rum revenues and taxes to the Puerto Rican government amounted to about $215,000,000. This sum was split into funds for education, health services, hospitals, hydro-electric power, agricultural agencies, road building, aqüeduct service, coffee crops, public works and social services.

The pilot plant at the University's experiment station aims to help Puerto Rican distillers build up the rum business even more.

Science News Letter, March 28, 1953

CHEMISTRY

Fundamental Structure For Protein Materials

➤ ONE FUNDAMENTAL pattern repeated with variations makes up most protein materials from gelatine to blood.

The pattern is that of a coiled spring, and the variations are found in whether the spring coils in the right-hand or left-hand direction and in how many fibers, themselves twisted, curl around one another to form the fibrous threads that make up the protein substance.

Reporting on two years of work on protein structure, Dr. Linus Pauling of the California Institute of Technology, told members of the American Chemical Society meeting in Los Angeles that hemoglobin, serum albumin from blood, an enzyme from egg white, and insulin, body chemical whose lack causes diabetes, have the same coiled form he had previously identified in horn, hair and skin. (See SNL, March 7, p. 150.)

Gelatine and collagen are simpler proteins whose structure also seems to follow the pattern. Three twisted chains appear to make up their fibers, although Dr. Pauling believes some modification of this structure will appear as his studies progress.

Silk fibers have a somewhat different structure, more like a pleated sheet than a twisted rope, the California experiments show.

Science News Letter, March 28, 1953

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE ACQUISITION OF WORD MEANINGS: A Developmental Study—Heinz Werner and Edith Kaplan—*Child Development Publications,* 120 p., paper, $1.75. A study of the processes of word understanding through verbal contexts.

AGRICULTURAL RESEARCH: Vol. I, No. 1—Agricultural Research Administration, U. S. Department of Agriculture—*Govt. Printing Office,* 16 p., illus., paper, bimonthly until July, 15 cents a copy, monthly thereafter $1.00 per year. The latest research findings and progress reports in agriculture.

AN APPRAISAL OF ANTHROPOLOGY TODAY—Sol Tax et al., Eds.—*University of Chicago Press,* 395 p., $6.00. Opinions of 82 leading anthropologists on the status of anthropology and its future.

BILLY BASS—R. W. Eschmeyer—*Fisherman,* 2nd ed., 47 p., illus., paper 50 cents, cloth $1.50. For children, this "life story" of a bass points out the effects of stream pollution.

BIOSTRATIGRAPHY OF THE MAQFI SECTION, EGYPT—L. W. LeRoy—*Geological Society of America,* Memoir 54, 73 p., illus., $1.75. A study of the *Foraminifera* of the Upper Cretaceous and Lower Tertiary strata.

BLOOD CELLS AND PLASMA PROTEINS: Their State in Nature—James L. Tullis, Ed.—*Academic Press,* 436 p., illus., $8.50. Results of a series of seminars held at Harvard University, Feb.-April, 1951.

BUILDING HEALTH—Dorothea M. Williams—*Lippincott,* 431 p., illus., $3.20. Approaches health education through the interest of junior high school students in "growing up."

CONTRIBUTIONS TO THE THEORY OF GAMES, Vol. II—H. W. Kuhn and A. W. Tucker, Eds.—*Princeton,* 395 p., paper, $4.00. Covers finite zero-sum two-person games, infinite zero-sum two-person games, games in extensive form, and general n-person games.

DEVELOPMENT INDEX—K. Lonberg-Holm and C. Theodore Larson—*University of Michigan Press,* 45 p., illus., paper, $1.50. A proposed pattern for organizing and facilitating the flow of information with particular reference to the development of buildings and communities.

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THE DISTRIBUTION OF SUBCUTANEOUS FAT IN CHILDHOOD AND ADOLESCENCE—Earle L. Reynolds—*Child Development Publications,* 189 p., illus., paper, $2.25. An analysis of X-ray soft tissue data, describing the methodology, the norms of different age levels, and sex differences along with some case material.

ENJOYING HEALTH—Evelyn G. Jones—*Lippincott,* 434 p., illus., $3.40. As the high interests in senior high school are attractive appearance and physical fitness, this health education text is built around these concepts.

A GENERAL DEGREE PHYSICS, PART 1: The General Properties of Matter—C. J. Smith—*Arnold (Longmans, Green),* 580 p., illus., $9.50. An introductory college text covering both experimental and theoretical aspects.

GEOLOGY OF THE MAMMOTH MINE, SHASTA COUNTY, CALIFORNIA—A. R. Kinkel, Jr., and Wayne E. Hall—*California Division of Mines,* Special Report 28, 16 p., illus., paper, 75 cents. Report of the ore deposits in one of the largest mines in the West Shasta copper-zinc district.

HEART DISEASE AND PREGNANCY—*American Heart Association,* 11 p., paper, free upon request to local heart associations of the AHA. For young women with heart disease who are planning to have children. (See SNL, March 21, p. 180.)

THE HOPIS: Portrait of a Desert People—Walter C. O'Kane—*University of Oklahoma Press,* 267 p., illus., $5.00. The views, customs and ways of life as practiced by the oldest living generation of these Arizona Indians.

MONKEY ON MY BACK—Wenzell Brown—*Greenberg,* 270 p., $3.50. Traces the lives of a group of teen-age drug addicts.

NEW SOLUTIONS TO PRODUCTION PROBLEMS—*American Management Association,* Manufacturing Management Series No. 200, 28 p., illus., paper, $1.25. Papers on research in industrial operations and human relations, and predetermined motion-time values.

THE OFFICIAL PREPARATIONS OF PHARMACY—Charles O. Lee—*Mosby,* 2nd ed., 544 p., illus., $5.50. Revised to conform to the "United States Pharmacopeia," 14th rev., and "National Formulary," 9th ed.

ORGANIZING FOR DEFENSE PRODUCTION. RELIEVING THE ENGINEERING SHORTAGE—*American Management Association,* Manufacturing Management Series No. 201, 42 p., paper, $1.25. Divided into two parts, the first is a panel discussion, the second relates how four leading companies have met the engineering shortage.

PHARMACEUTICAL ARITHMETIC: A Complete Course in Everyday Problems in Dispensing, Manufacturing and Hospital Pharmacy—Ignatius J. Bellafiore—*Mosby,* 3rd ed., 226 p., illus., paper, $4.50. Sections on isotonic solutions, antibiotics, vitamins, antihistamines and sulfa drugs have been revised.

PIONEERING IN AERONAUTICS: Recipients of the Daniel Guggenheim Medal 1929-1952—*Daniel Guggenheim Medal Board of Award,* 147 p., illus., paper, $1.25, cloth $2.25. Biographies of people who have made notable achievements in aeronautics.

PIX-O-FIX: TV Troublefinder Guide—Alfred A. Ghirardi and R. G. Middleton—*Rinehart,* 12 p., illus., paper, $1.00. Illustrations of television patterns on a dial serve as a guide to identification of the causes, the location, and the repair of everyday TV receiver troubles.

A REVISION OF THE COLOMBIAN SPECIES OF MONNINA (POLYGALACEAE)—Ramón Ferreyra—*Smithsonian Institution,* Smithsonian Misc. Col. Vol. 121, No. 3, 59 p., illus., paper, 50 cents. A discussion of the morphology and distribution of the species.

SAUDI ARABIA: With an Account of the Development of Its Natural Resources—K. S. Twitchell—*Princeton,* 2nd ed., illus., $5.00. Recent developments in oil and transportation are covered in this new, up-to-date edition about this increasingly important Near Eastern country.

SEXUAL HARMONY IN MARRIAGE—Oliver M. Butterfield—*Emerson,* 96 p., illus., $1.50. Establishes sound, intelligent attitudes toward sex and its place in life.

THE SOVIET IMPACT ON SOCIETY: A Recollection—Dagobert D. Runes—*Philosophical Library,* 202 p., $3.75. An analysis of the cultural and social changes in the Western and Eastern world brought on by Marxism.

SYNCHROS SELF-SYNCHRONOUS DEVICES AND ELECTRICAL SERVOMECHANISMS—Leonard R. Crow—*Scientific,* 222 p., illus., $4.20. Covers their basic fundamental principles, their use and application.

TOMMY TROUT—R. W. Eschmeyer—*Fisherman,* 2nd ed., 49 p., illus., paper 50 cents, cloth $1.50. For children, this plea for fish conservation is told from a "trout's eye" viewpoint.

THE UNDERSEA ADVENTURE—Philippe Diolé, translated by Alan Ross—*Messner,* 236 p., illus., $4.50. The history and romance of life beneath the sea as seen by the author with the aid of the aqualung.

THE UNEDUCATED—Eli Ginzberg and Douglas W. Bray—*Columbia,* 246 p., $4.50. Shows the changing role and position of the uneducated since 1890, presents case histories in both military and civilian life, and makes major policy recommendations for education and military service.

THE VIENNA CIRCLE: The Origin of Neo-Positivism, A Chapter in the History of Recent Philosophy—Victor Kraft—*Philosophical Library,* 207 p., $3.75. Tracing the history of a philosophical movement founded by an interpreter of the theory of relativity.

WOODSMOKE: The Book of Outdoor Lore—Ellsworth Jaeger—*Macmillan,* 228 p., illus., $2.95. For the outdoor camper, this shows, step by step, useful crafts and camping skills.

YEARBOOK OF PHYSICAL ANTHROPOLOGY, 1951—Gabriel W. Lasker and William L. Straus, Jr., Eds.—*Wenner-Gren Foundation for Anthropological Research,* 298 p., illus., paper, free upon request to publisher, 14 E. 71st St., New York 21, N. Y.

MEDICINE

Aid Legless and Blind

➤ VETERANS FROM nations otherwise at each other's throats—from Israel and Egypt, from India and Pakistan, from Italy and Yugoslavia—will join hands this year to plan rehabilitation programs for the legless, the handless and the blinded victims of war.

In all, 16,000,000 veterans from 19 nations, including the United States, are cooperating through the World Veterans Federation to bring to all countries the knowledge garnered in the more fortunate about rehabilitation of disabled veterans. Amputees of Ethiopia, paraplegics of the Greek civil war now have hope of a life better than one of begging.

Folding wheel chairs and mats have been given by the Federation to paraplegics in Greece and a physical rehabilitation program has been started for them in Athens. At a recent meeting of the Federation in London, Israeli and Egyptian veterans of the recent struggle over Palestine talked about how they could cooperate to bring the disabled veterans fully into the economy of their respective countries.

For the first time in Israel there will be a vocational training school for disabled veterans. The World Veterans Federation will send a rehabilitation specialist and an architect to Egypt to pilot that nation through the first steps in constructing a rehabilitation center. An Ethiopian veteran who lost a leg in the Korean struggle is being fitted with a new one through the good offices of one of the American veteran organizations in the WVF.

Rehabilitation and training of disabled veterans of the Korean war should be of the same high standard in all nations supporting the United Nations, the WVF has declared. A resolution to this effect will be pressed in current meetings of the United Nations General Assembly.

The WVF finds that not all knowledge is centered in Europe and the United States. At Poona, India, a forward looking artificial limb center is already in operation. The WVF is now attempting to secure the cooperation of the Indian government in setting up a training course at Poona for the training of artificial limb personnel. They will come from all the nations of southeast Asia, especially from Malaya and French Indo-China, scene of bloody struggles against communism.

In all, the WVF plans four training courses during 1953. They will be held in France, Germany, Great Britain and India. Physicians, artificial limb fitters and technicians, teachers of the blind will meet to exchange information about the latest techniques in rehabilitation work.

The WVF is taking the lead in standardizing the production of "talking books" for the blind. Today only the United States, Great Britain and France have talking books. This year the WVF will carry this service to Belgium, the Netherlands, Italy, Greece, Yugoslavia and Finland.

CARE is cooperating with WVF in assembling kits in this country for disabled veterans. These can be sent by interested Americans to veterans in Europe, just as the food and clothing parcels are sent. A Braille writing kit makes up one package, a folding wheelchair another. In all, eight different kits, ranging in duty-free price from $17.50 to $90, have been designed.

Heading the WVF rehabilitation program until this year was Dr. Kurt Jansson, the man who spark-plugged Finland's much-praised program. He now is director of the United Nations rehabilitation program.

American member organizations of the WVF are the Disabled American Veterans, the Blinded Veterans Association, the Military Order of the Purple Heart, AMVETS and the American Veterans Committee (AVC).

Science News Letter, March 28, 1953

Continuing a three-year trend, the number of students applying for admission to U. S. *medical schools* declined again during the 1952-53 term.

DO YOU *know the secret of how to* SELL WHAT YOU WRITE *—even if you are a beginner?*

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A Handful of Ideas from WHY NOT WRITE?

• Do you want to write a book? With sky high book publishing costs, American publishers can afford to issue only titles which they feel certain will sell well. For a first novel, this cuts the chances of acceptance close to zero.

Yet in Britain a book can be published successfully even if it sells 10,000 copies less than American publishers consider necessary. So, if your book is not solely American in appeal and its chances for publication in the U. S. seem dim, contact British Commonwealth publishers (listed in "Why Not Write?"). Once you have a book in print abroad, the prestige that goes with it counts heavily towards getting published in this country.

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••Must you retype a page of manuscript with several corrections? Editors don't mind seeing a page with a few corrections—up to four neat corrections are allowable on each manuscript page.

••The ultimate key to successful writing. The amateur REPORTS what he sees or knows; the professional INTERPRETS it.

• Where do ideas for articles come from? Have you tried the yellow pages of the telephone directory? Thumb through it until something strikes a chord. Automobiles, Bakers, Chemicals, Dogs, Electricians, Florists . . . within 30 minutes you find literally hundreds of basic ideas. (See below.)

• How to treat a subject for an article. You can sell articles answering **How would I choose a . . . . . ?** Fill in the last word: how to choose a dog, a college, a car, a motel, a home. Another formula: write about ". . . . . something to . . . . . " For example: . . . . . **something to dogs.** Fill in the first blank with an appropriate word or phrase: **Teaching something to dogs, giving something to dogs**—or, **your presonality is something to dogs.** From here you get idea germs like: **Seven Short Steps to Housebreaking a Puppy. A Sure-fire Way to Give Your Dog a Pill. Making Friends with a Bulldog, etc.**

• Where to obtain facts and background material for stories and articles: **Mudge's Guide to Reference Books.** Through its help you can find a wealth of material on almost any subject you might want to write about.

So you get only $10-$15 for a 3000 word story or article. But the lift you get from seeing your name and your work in print is compensation enough at that stage. And it won't be long before you'll be getting 1¢, then 2¢ and later 3¢ a word. Most of a writer's work during the middle years of his apprenticeship should bring from $50 to $100 per article or short story. Anyone who can devote a few hours each evening and at weekends to writing should readily be able to add $200 or more a month to his income.

Eventually, too, you'll feel justified in breaking the bonds of your job and moving down to that seaside cottage in Florida.

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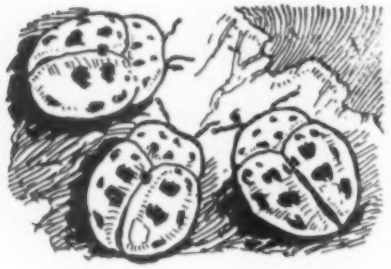
Now, at last, in one handy, low cost guide, you can see at a glance where to send whatever you write. Here are thousands of literary markets, complete with names and addresses, you'd never have thought of. (And neither will most other writers and would-be writers, who flood the best known publishers with so much material they just couldn't publish it all in a hundred years.) Avoid the competition, get your manuscript where it's wanted—and write what you have to say. Only $1 on a money-back guarantee if not satisfied.

For your copy, print name and address on sheet of paper, ask for "Why Not Write?" and mail with $1 to HARIAN PUBLICATIONS, 30 Wilson Pky., Greenlawn (Long Island), New York.

BOTANY

NATURE RAMBLINGS



Early Ladybirds

➤ AMONG SPRING'S "early birds" are the ladybirds. These attractive little spotted beetles, the delight of children, are astir very early.

They have hibernated in hidden cracks and crannies, and the first warm, sunny days tempt them forth. As a matter of fact, they are likely to turn up even during late-winter thaws, along with woolly-bear caterpillars and a few other insects that are able to become active on just a little thermal encouragement.

Why they are called ladybirds is not known with any certainty. One conjecture is that in medieval times they were considered the special charges of Our Lady; their daintiness and apparent harmlessness would make such a fancy quite natural.

Such gentle patronage, however, may possibly be questioned. For the harmlessness of the ladybird beetles is only apparent; actually they are among the fiercest of predators in the insect world, attacking and devouring other insects with voracious appetite. Their tawny color, and the spots that most of them bear, would make some such name as leopard beetle more appropriate.

Most people are unlikely to find fault with the ladybird's carnivorous tendencies, once they learn towards what these tendencies are directed by most of the commoner ladybird species, for there are several kinds of these hungry little insects. The ladybirds you most often see prey upon scale insects, aphids or plant lice, and similar enemies of man's most cherished and necessary possessions, the cultivated plants.

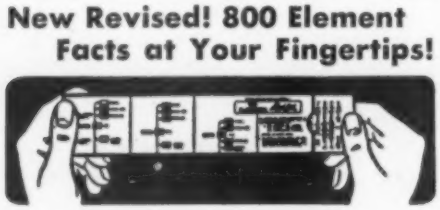
They are, therefore, allies in the camp of the human species, with their hands, or rather their mandibles, against their closer kindred of the six-legged world.

In at least one classic case, ladybird beetles were even brought to this country from far overseas to aid in the human struggle against swarming hordes of insect enemies. Ladybird beetles imported from Australia have helped to keep under control one of the worst of the insect enemies of California's citrus groves, a nasty parasite known as the San Jose scale.

They have not entirely wiped out this destructive pest, for to do so would mean their own elimination through lack of a staple food supply. However, by helping keep the scale reduced to a manageable level they have more than justified their existence.

Science News Letter, March 28, 1953

New Revised! 800 Element Facts at Your Fingertips!



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TECHNOLOGY

"Flying Yardstick" Figures Land Areas

➤ A "FLYING yardstick" has been developed by pilots and scientists of the Ontario Department of Lands and Forests to help them estimate the size of forest fires.

Called the aerial estimator, the device quickly reveals how much land is on fire. It also can be used to check the acreage burned after the fire has been brought under control.

The device resembles the reflector-type of gunsight used by some fighter pilots. A half spherical mirror projects an image of known size onto the area being checked. Circles on the viewing glass provide the user with data which in turn will reveal the size of the area being checked.

To be installed in some government aircraft, the flying yardstick also can be used to estimate the size of timber stands, areas cut in timber operations, and the size of lakes, mountains and other geographical features.

Science News Letter, March 28, 1953

AERONAUTICS

Save Pilots in Crashes

➤ AGRICULTURAL PILOTS and others who are subject to low-level crashes while flying will be particularly interested in a new shoulder-harness-seat-belt and gravity reel combination developed by Fred E. Weick, director of the Personal Aircraft Research Center at Texas A. and M. College, College Station, Tex.

Mr. Weick, a nationally-known aircraft designer and engineer, combined the seat-belt with the shoulder-harness so that both can be fastened quickly and easily, using the seat-belt buckle alone.

At the rear, the shoulder straps slide over a tubular support and down to an inertia-locking reel mounted on the rear wall of the cockpit.

This arrangement allows free movement of the whole upper body, so long as the plane does not experience a deceleration of three g's or more, as it would in even a mild crash.

In the event of a crash, the reel moves forward of its own inertia against a light spring clamp and engages a ratchet which locks it in place. If the pilot knows he is going to crash, he can lock the reel in advance by moving a handle on the left side of his seat.

Immediately after the plane comes to a full stop, the reel disengages from the ratchet, again allowing full movement.

The combination belt-harness is more convenient in most aircraft, since it is hung on two small pegs in the cockpit walls when not in use. The pilot sits down, lifts the belt down and fastens it. Frequently this can be done more quickly than the loose ends of the ordinary seat-belt can be found, straightened out and fastened, Mr. Weick said.

The modification in which each shoulder strap is permamently joined with the seat-belt can be used regardless of whether the inertia reel is incorporated.

Science News Letter, March 28, 1953

CHEMISTRY

Paints to Show What's Red Hot

➤ "RED HOT" may have a new meaning soon as the result of a new series of special purpose paints being developed at the Naval Research Laboratory in Washington, and reported by A. L. Alexander, J. E. Cowling and Peter King to the meeting of the American Chemical Society in Los Angeles.

Metallic compounds which change color when they reach certain temperatures have been made into paints by this research team. These paints can be spread or sprayed onto aircraft engines, industrial heat exchangers and other inaccessible spots where it is important to know the maximum temperatures reached during a run, but difficult to attach measuring instruments.

Combining a solution of colorless methacrylate resin with the brightly colored compounds of cobalt, nickel, iron, manganese, chromium and copper, the Naval Research Laboratory chemists have produced a whole series of tell-tale paints which can be used to determine the heat developed over a wide range of temperatures.

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Questions

ASTRONOMY—Of what does Saturn's atmosphere mainly consist? p. 202.

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BIOCHEMISTRY — How many chemicals are needed to digest fat? p. 200.

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CHEMISTRY—What is the fundamental pattern of most protein materials? p. 203.

What fission products tell that an A-bomb has been exploded? p. 198.

• • •

DENTISTRY—How are present tooth decay theories too simple? p. 196.

• • •

MEDICINE—How are war victims of most nations now being helped? p. 205.

• • •

PUBLIC HEALTH—Why should men over 35 have chest X-rays regularly. p. 196.

• • •

Photographs: Cover and p. 195, United Press-Photo; p. 197, Minneapolis-Honeywell Regulator Co.; p. 198, Purdue University; p. 199, Yale University-Alburtus; p. 208, Bakelite Company.

BIOCHEMISTRY

Control Skin Color

➤ TWO DRUGS are being used to control skin color in humans and to correct blemishes such as over-pigmented spots or the milky-colored spots that occur in the disease, vitiligo.

The drugs are the monobenzylether of hydroquinone and a new one called psoralens. Their use to control skin color was announced by the American Cancer Society which supports the work of the scientists, Drs. A. Bunsen Lerner and Thomas B. Fitzpatrick of the University of Oregon Medical School.

Object of their research is to learn the processes which produce albinism, disfiguring birthmarks, the colors associated with many diseases and the deadly pigmented cancer called melanoma.

The scientists have found that skin color is affected by many factors including diet, sunlight, hormones and aging.

The scientists and their co-workers are engaged in three separate types of pigmentation studies. They 1. attempt to change the pigmentation of patient's skin—no hormones are involved, 2. try to change the color of frog skins with hormone preparations, and 3. incubate skin from humans with various chemicals in order to study the action of the cells in the pigmentation process.

They can color and decolor isolated frog skin at will by what appears to be duplication of the body's actual chemistry. Some of the tests on living animals confirm the chemical observations on isolated skin and tissue extracts.

They have traced several of the chemical steps in the body's formation of melanin, the natural compound which gives color to the skin, hair and eyes, and they are attempting to produce chemicals which interfere with its production.

Science News Letter, March 28, 1953

CHEMISTRY

Inulin Puts Tang in Tequila and Pulque

➤ INULIN PUTS the tang in tequila, Dr. Marcial Ibarra of the National University of Mexico reported to the American Chemical Society meeting in Los Angeles.

Eight different species of the agave plant were studied by Dr. Ibarra and his associates. This plant furnishes the pulp from which the two Mexican beverages, pulque and tequila, are made. Several strains of the yeasts used in their fermentation were determined, and the fermentation of the "aguamiel" and other processes described.

Unlike corn, rye, potatoes and other sources of fermented and distilled liquors, the agave has inulin instead of starch, Dr. Ibarra finds. This is fermented to alcohol. Very small amounts of fermentable sugar are present, mostly fructose. So little nitrogenous material is present that Dr. Ibarra's group had to add salts of ammonia to nourish the yeasts with which they experimented.

The source of the higher alcohols which give tequila part of its distinctive flavor is still somewhat of a mystery. The Mexican scientists report that they do not come from the small amount of amino acids in the fermentable juice.

Science News Letter, March 28, 1953

AGRICULTURE

Bigger Corn Crop

➤ CHEMICAL WEED killers should be used by the nation's farmers to produce corn efficiently and economically, Dr. Roy L. Lovvorn, head of weed control research in the U. S. Department of Agriculture, said.

Use of the weed killer 2,4-D just before and shortly after corn plants emerge, plus a final spraying after lay-by reduces the number of cultivations needed and actually increases the crop yields, Dr. Lovvorn said.

Chemical control of weeds without further cultivation has increased yields on experimental fields as much as 10 to 40 bushels of corn an acre at a cost of only $2.25 an acre for all three sprays.

In most areas and soils, Dr. Lovvorn said, pre-emergence treatment of one to two pounds of pure 2,4-D will control annual grasses and some broadleaved weeds. Other broadleaved weeds in corn can be controlled by sprays of one-quarter-pound of 2,4-D ester, or one-half pound of amine salts of 2,4-D, per acre about one week after the young corn leaves unfold.

Corn on certain soils produces better with cultivation even when no weeds are present. A Fox silt loam on an experimental field produced 39 bushels of corn with no weed control; 80 bushels with weed killers but no cultivation; and 101 bushels with chemical treatment and three cultivations.

On another soil, however, Genessee silt loam, 87 bushels came from an unweeded field; 111 bushels with chemical control alone; and no further increase with chemicals plus cultivation.

Hybrids and varieties of corn vary in their tolerance of 2,4-D, but are generally resistant under recommended amounts of spray. Inbred lines and corn from single-cross seed are more susceptible to 2,4-D, Dr. Lovvorn said, and should be sprayed only in an emergency unless their tolerance has been proved.

Science News Letter, March 28, 1953

SOCIOLOGY

Monopoly Shows It Has Advantages

➤ A SOCIOLOGIST at the University of Wisconsin says he has laboratory proof for the truth of the old saying, "The rich get richer and the poor get poorer."

The sociologist is Lyle Shannon. His proof came from the parlor game, Monopoly, rigged to give one player cash and property advantages over the other three. In addition, the fourth player was subjected to restrictions like "covenants and similar forms of discrimination against non-Caucasians."

Details and results of the experiment are reported in *Social Forces*.

Science News Letter, March 28, 1953

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• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N ST., Washington 6, D. C., and ask for Gadget Bulletin 667. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

EAR PROTECTOR, a plug-like device that slips into the ear, is a "sonic filter" that softens loud noises, yet permits the wearer to hear sounds of ordinary voice level, the manufacturer states. The device has a new soft silicon rubber tip that resists skin oils and ear wax.

Science News Letter, March 28, 1953

PENCIL-COUNTER OUTFIT, especially useful where items must be checked and counted on blueprints, allows the user to devote full attention to finding and checking the item. An electric counter arrangement keeps track of the number of items checked with the pencil.

Science News Letter, March 28, 1953

WALLPAPER ADHESIVE, a powder that mixes easily with water, allows amateur paper hangers plenty of time to align intricate patterns before it "sets." A wet cloth or sponge removes any stains that may appear after the paste has dried, the maker reports.

Science News Letter, March 28, 1953

ANATOMICAL MODELS of the human body are accurately molded in three dimensions, and permit students of anatomy to see, touch and remove 26 organs of a muscle-man torso and head. Made of a vinyl plastic, the pigmented model organs have the texture of living tissue, and are

hand-painted by skilled artists, as shown in the photograph.

Science News Letter, March 28, 1953

TRAINING CUP for babies helps them "switch" from bottles to glasses and cups. The plastic training cup has two large handles and the face of a clown embossed upon it. A nipple-like top fits over the cup to eliminate drip and spill until baby becomes accustomed to drinking from cups.

Science News Letter, March 28, 1953

FISHING REEL is built into the large end of a pear-shaped fishing rod handle. Visible through a half-dome covering of clear butyrate plastic, the reel works on a slip-cast principle, eliminating backlash. The crank handle disengages for casting, and an adjustable line clutch maintains drag tension on the line. Interchangeable spools are available for the reel.

Science News Letter, March 28, 1953

ANTI-FOULING COMPOUND is painted on ship hulls to keep them free of barnacles and other marine animal life. A test revealed the compound completely protected one ship for a year.

Science News Letter, March 28, 1953

PROTECTIVE SKIN cream, developed for persons who suffer from skin sensitivity to soap, water and some industrial materials, is applied to the skin and builds up an invisible plastic-like film that acts as a physical barrier against agents that cause irritation, the manufacturer states. The protective coating does not come off in normal washing.

Science News Letter, March 28, 1953

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Do You Know?

At least 90% of the known *stars* are less luminous than the sun.

The slower a person writes, the better his *handwriting* appears to be.

It has been predicted that 100 new *television stations* will go on the air in 1953.

Jet engines can raise the temperature inside an engine test room to 1,200 degrees Fahrenheit in eight seconds.

Dehydrated *steaks* that can be dunked in water and cooked like fresh meat may one day become a reality for U. S. troops.

British research scientists have produced what is believed to be the brightest man-made *photoflash lamp;* for 1/25 second, it is as bright as the sun.

Timing *pedestrians* with stopwatches, Oslo researchers have discovered that Norwegian men walk at a speed of 3.5 miles an hour, women 3.3 miles an hour; men 20 to 30 years old averaged nearly 3.8 miles an hour.